



EPA Region 7 TMDL Review

TMDL ID: KS-LA-10-536-1 **Waterbody ID:** KS-LA-10-536_1
Waterbody Name: LOWER ARKANSAS RIVER -- MAIZE TO DERBY -- CHLORIDE
Tributary: SEE (ENCLOSURE A) FOR TRIBUTARIES COVERED UNDER THIS TMDL
Pollutant: CHLORIDE
State: KS **HUC:** 11030010
BASIN:
Submittal Date: 6/30/2006
Approved: Yes

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter, dated June 30, 2006, and received by EPA on June 30, 2006, formally submitted this TMDL for approval under Section 303(d). A revised version was submitted by email on August 7, 2006.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

At Maize, excursions in each of the three defined seasons are noted. Seventy-eight percent of the Spring samples and 83% of the Summer-Fall samples are above the domestic water supply standard. Ninety-five percent of the winter samples are over the domestic supply criterion. Overall, 86% of the samples are above the domestic water supply standard. Two out of the 93 samples exceeded the Aquatic Life Support standard. The exceedances occurred during the Winter medium flows.

Site 729 (Wichita): Excursions in each of the three defined seasons are outlined in Table 7. Sixty-four percent of the Spring samples and 67% of the Summer-Fall samples are above the domestic water supply standard. Eighty-three percent of the Winter samples are over the domestic supply criterion. Overall, 72% of the samples are above the domestic water supply standard.

Site 281 (Derby): Excursions in each of the three defined seasons are outlined in Table 8. Sixty-three percent of the Spring samples and 56% of the Summer-Fall samples are above the domestic water supply standard. Eighty-eight percent of the Winter samples are over the domestic supply criterion. Overall, 71% of the samples are above the domestic water supply standard. The high exceedance rate during the Winter season coincides with the low flow period of the year.

The comparisons of chloride concentrations between stations (Figures 5-7) clearly show a general pattern of dilution from Maize to Derby.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The Kansas chloride criteria for domestic Water Supply is 250 mg/L at any point of domestic water supply diversion (K.A.R.28-16-28e(c)(3)(A)). For aquatic life support [acute criterion] is 860 mg/l for (KAR 28-16-28e(c)(2)(D)(ii)).

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The ultimate endpoint for this TMDL will be to achieve the Kansas Water Quality Standards fully supporting Drinking Water Use. This TMDL will, however, be staged. The current standard of 250 mg/L of chloride is used to establish the initial TMDL. Since the standard is not achievable due to the relatively high natural contributions to the chloride load, an alternative endpoint is needed at sites 536, 729, and 281. Kansas Water Quality Standards and their Implementation Procedures for Surface Water allow for a numerical criterion based on natural background concentrations to be established, particularly from ambient samples taken at flows less than median flows. The Stage II end points are set at the background concentrations tentatively for sites 536, 729, and 281 and are 620 mg/L, 410 mg/L, and 385 mg/L, respectively. The specific stream criteria to supplant the general standard will be developed concurrent with Stage One of this TMDL.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There are three wastewater treatment facilities that discharge medium to large amounts of chloride into the streams and numerous smaller dischargers. All but the Brooks Landfill GW Remediation Project discharge at concentrations less the drinking water criteria and therefore do not contribute to the impairment at their current levels.

Irrigation use of the surface or ground water is very limited in the area because of the dominant urban land type in the area. Irrigation has minimum impacts on the chloride levels in the streams. Stormwater runoff or high flow events are not a cause or contributing factor for the chloride impairment in the area since chloride is diluted below 250 mg/L at high flows. Brine from Oil and Gas fields are scattered in the area. Their effects to the watershed are probably localized to the production areas and not contributing to the chloride. The chloride levels at Maize are a function of upstream sources which was address in a companion document for the river reach between Hutchinson and Maize.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The point source discharges generally have lower chloride concentrations than the levels in the Arkansas River, and therefore help to dilute the chloride in the stream. Upstream chloride loads at Maize are the major contributor to the high chloride levels in the area and the allocations established in the companion TMDL for Hutchinson to Maize will ameliorate the downstream problems as well. Addition of a ground water remediation project above the Wichita Wastewater Treatment Plant can have huge impacts on the chloride loadings and concentrations in the Arkansas River and the impacts of this activity are identified in the TMDL.

WLA Comment

Wasteloads for various management options are described in the TMDL. The Wasteload Allocations (50 t/d) are computed under the design flow. A Scenario for the three high impact facilities (as show in Tables 10 and 12 of the TMDL document).

LA Comment

Load allocations are described for various scenarios depending on conditions, such as, the proposed Groundwater Remediation Project.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The Margin of Safety is implicitly set because the area sources are the main contributors for the chloride impairment and the endpoints are established from the winter data when man-made influences are minimal. Furthermore, loadings from the point sources act as a dilution base for natural chloride contributions.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation has been incorporated in this TMDL through the documentation of seasonal patterns of elevated chloride levels, especially during periods of low flows and extended drought.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings to discuss TMDLs in the Lower Arkansas Basin were held on June 7, 2006 in Hutchinson. An active Internet Web site was established at <http://www.kdhe.state.ks.us/tmdl/> to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Lower Arkansas Basin. Public Hearings on the TMDLs of the Lower Arkansas Basin was held on June 7, 2006 in Hutchinson. The Lower Arkansas Advisory Committee met to discuss the TMDLs in the basin on June 7, 2006.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

KDHE will continue to collect bimonthly samples at Stations 511, 512, and 266, including chloride samples, in each of the three defined seasons over 2006-2011. Based on that sampling, the priority status will be evaluated in 2012 including application of numeric criterion based on background concentrations. Monitoring of chloride levels in effluent will be a condition of NPDES and state permits for facilities. This monitoring will continually assess the contributions of chloride in the wastewater effluent released to the stream.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

As discussed above all facilities except the Brooks Landfill GW Remediation Project are not contributing to the impairment and often provide dilution. The Brooks facility is discharging at levels below those anticipated after adoption of site specific water quality standards. The facility would therefore not be considered as contributing.

